Amendments to the Drawings

New drawings are submitted herewith which contain functional labels which have been added to Fig. 1 as requested by the Examiner.

It is noted the Examiner has objected to the drawings as not showing every feature of the claimed invention with the Examiner requiring illustration of the wideband amplifier and spectral analyzer. The specification has been amended to refer to the processing unit "may be associated with a wideband amplifier" and the computing unit "may perform spectral analysis" to address the Examiner's objection to the drawings not illustrating the claimed subject matter.

REMARKS

The present invention is a method for examining a sample surface using an atomic force scanning microscope comprising a cantilever with a longitudinal extension along which a measuring tip is disposed, which is located relative to said sample surface by a means for driving and having a spatial position detected with a sensor, and at least one ultrasound generator, which initiates vibration excitation at an excitation frequency between said sample surface and said cantilever, the measuring tip being brought into contact with said sample surface so that said measuring tip is excited to vibrations oriented lateral to said sample surface and perpendicular to said longitudinal extension of said cantilever, torsional vibrations being induced in said cantilever which are detected and analyzed by an evaluation unit, said vibration excitation causing oscillations of said measuring tip including harmonic vibrations relative to the excitation frequency and said vibration excitation includes excitation amplitudes which cause torsional amplitudes within the cantilever with maximum values thereof forming a plateau of resonance spectra despite increasing excitation amplitudes and the resonance spectra which undergoes, in a range of said maximum values of said torsional amplitudes, a widening which is determinable by a plateau width. The method uses at least one of the plateau of said resonance spectra, a width of the plateau of said resonance spectra and/or a gradient of said resonance spectra for examining said sample surface.

Moreover, the specification at the bottom of page 5 and the top of page 6 specifically teaches the utility of the present invention to examine a sample surface

as follows:

> A key element of the present invention is that a method for examining a sample surface by means of an atomic force scanning microscope comprising a cantilever with a longitudinal extension, along which a measuring tip is disposed, which is selectively arranged relative to the sample surface via a means for driving and the spatial position of which is detected by a sensor unit, and is provided with at least one ultrasound generator, which initiates a vibration excitation with a given excitation frequency between the sample surface and the cantilever. The measuring tip of the cantilever is brought into contact with the sample surface, in such a manner that the vibrations imparted to the measuring tip are oriented lateral to the sample surface and perpendicular to the longitudinal extension of the cantilever. Torsional vibrations that are formed in the cantilever are detected and analyzed by means of an evaluation unit. Vibration excitation occurs in such a manner that the oscillations executed by the measuring tip have higher harmonic vibration parts relative to the excitation frequency. The vibration excitation preferably occurs with a continuous wave signal which is wobbled, that is varied, within a given excitation frequency range. The excitation frequency range is selected in such a manner that the resonant basic vibration of the cantilever having the measuring tip in contact on the sample surface lies inside the excitation frequency range.

A new Declaration is provided to address the Examiner's objection in Section 2 of the Office Action.

New drawings are submitted herewith which contain functional labels which have been added to Fig. 1 as requested by the Examiner.

It is noted the Examiner has objected to the drawings as not showing every feature of the claimed invention with the Examiner requiring illustration of the wideband amplifier and spectral analyzer. The specification has been amended to refer to the processing unit "may be associated with a wideband amplifier" and the computing unit "may perform spectral analysis" to address the Examiner's objection to the drawings not illustrating the claimed subject matter.

The specification has been amended to improve its form for reexamination.

Claims 1-15 stand rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as the invention. The claims have been amended to overcome the stated grounds of indefiniteness.

Claims 1-13 stand rejected under 35 U.S.C. §102 as being anticipated by "Quantitative Determination of Contact Stiffness Using Atomic Force Acoustic Microscopy" (Rabe et all). These grounds of rejection are traversed with respect to new claims 16-33 for the following reasons.

Rabe et al do not disclose the claimed "maximum values thereof forming a plateau of the resonance spectra despite increasing execution amplitudes and the resonance spectra which undergoes in a range of said maximum values of said torsional amplifiers, a widening which is determined by plateau width." Moreover, Rabe et al do not disclose "using at least one of the plateau of said resonance spectra, a width of the plateau of said resonance spectra and/or a gradient of the resonance spectra for examining said sample surface." Accordingly, it is submitted that claims 16-33 are not anticipated by Rabe et al. If the Examiner persists in the stated grounds of rejection, it is requested that he point out on the record where Rabe et al discloses the foregoing subject matter. It is submitted that the experimental contact residence spectra illustrated in Figs. 4A-C and further, in Fig. 8, do not meet the foregoing subject matter.

Claims 1-13 stand rejected under 35 U.S.C. §102 as being anticipated by "atomic force microscopy at ultrasonic frequencies" (Arnold et al). These grounds of rejection are traversed with respect to newly submitted claims 16-33 for the following reasons.

The Examiner's reference to Arnold et al's section 6.3 stick-slick and friction is noted. Measurement results are described involving spectra of torsional vibration resonances in contact with a sample surface as a function of excitation amplitude. Moreover, the authors of the article interpret the broadening peak of the torsional resonance with increasing excitation amplitudes that harmonics begin to appear, and further believe that this non-linear resonance behavior is a sign of the beginning of stick-slick between the probe and the sample. However, Arnold et al do not teach the claimed subject matter of claim 16 of "using at least one of the plateau of said resonance spectra, a width of the plateau of said resonance spectra and/or a gradient of said resonance spectra for examining said sample surface." The Author's reference to a future publication 41 states "[a]t present, a detailed analysis of the data is prepared for publication [41]". Accordingly, it is seen that the Arnold et al publication does not anticipate the use limitation of claim 16. Accordingly, claims 16-33 are not anticipated by Arnold et al.

Claims 14 and 15 stand rejected under 35 U.S.C. §103 as being unpatentable over Rabe et al. In Section 13 of the Office Action, the Examiner refers to DE 19 900 114 (Krotil et al). However, it is noted that Section 14 of the Office Action also states a rejection of claims 14 and 15 under 35 U.S.C. §103 as being unpatentable over Arnold et al in view of Krotil et al. It is therefore interpreted that Sections 13 and 14 of the Office Action are meant to state the grounds of rejection which the Examiner wishes to apply against claims 14 and 15 as stated in Section 14. These grounds of rejection are traversed for the following reasons.

Krotil et al have been cited as disclosing a method for determining friction and other material properties by imparting torsion to a cantilever and examining the

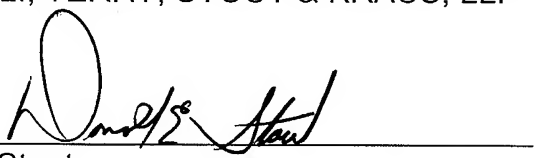
vibration using a lock-in amplifier and Fourier transformation to determine the friction amplitude and phase of a measuring signal. However, Krotil et al do not cure the deficiencies noted above with respect to Arnold et al regarding the patentability of new claims 16-33. Accordingly, the rejection of claims 14 and 15, which correspond to new claims 32 and 33, is traversed since Krotil et al do not cure the deficiencies noted above with respect to Arnold et al with respect to claims 16-33.

In view of the foregoing amendments and remarks, it is submitted that each of the claims in the application is in condition for allowance. Accordingly, early allowance thereof is respectfully requested.

To the extent necessary, Applicants petition for an extension of time under 37 C.F.R. §1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 01-2135 (785.44774) and please credit any excess fees to such Deposit Account.

Respectfully submitted,

ANTONELLI, TERRY, STOUT & KRAUS, LLP



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Attachments

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